PHYSICAL FITNESS AND ITS EFFECT ON PERSONALITY, BEHAVIOR AND LEADERSHIP "MANAGEMENT AND EMPLOYEE MUSCLE"

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NAVAL POSTGRADUATE SCHOOL
Monterey, California

THESIS

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PERSONALITY, BEHAVIOR AND LEADERSHIP
"MANAGEMENT AND EMPLOYEE MUSCLE"

by

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This study was undertaken to give interested organizations a better idea of what to expect from improved management and employee muscle. The effort was focused on uncovering the personality and behavioral changes which result from improved physical fitness because there is lack of clear and consistent information in these areas. Because of the growing number of executives and managers who are committing themselves to better fitness, the uncovered personality and behavior changes were also related to common leadership traits.

The results indicate that improved physical fitness can significantly affect the individual in terms of changes in personality and behavior. These changes also appear to have a significant positive effect on individual leadership traits.

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Physical Fitness and Its Effect on Personality, Behavior and Leadership "Management and Employee Muscle"

by

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B.S., University of Oklahoma, 1969
Master of Engineering, University of Florida, 1972

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September 1979

ABSTRACT

There is a growing interest among corporations and government agencies for improving management and employee muscle. The list of organizations that have established physical fitness programs for their managers and employees is expanding every day. Those not yet committed are contemplating the consequences of initiating such an effort.

This study was undertaken to give interested organizations a better idea of what to expect from improved management and employee muscle. The effort was focused on uncovering the personality and behavior changes which result from improved physical fitness because there is a lack of clear and consistent information in these areas. Because of the growing number of executives and managers who are committing themselves to better fitness, the uncovered personality and behavioral changes were also related to common leadership traits.

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I. INTRODUCTION

During 1962, the President of the Life Extension Foundation, Mr. H. Johnson, indicted that exercise and physical fitness are generally neglected by executives. Only 12 percent followed regular daily exercise programs, 35 percent limited their exercise to weekends and 53 percent did not exercise at any time (Johnson, 1962, p. 58). During 1975, the Executive Vice President of the Idaho Hospital Association, John D. Hutchison, concluded that most executives are physically unfit. They have the third highest death rate in the country and a very high incidence of heart disease. Moreover, executives tend to smoke and drink too much, exercise too little, to be highly anxious and competitive, and to have high blood pressure and other conditions that contribute to heart disease (Hospitals, 1976). Fortunately, several significant factors are dramatically changing the above situation.

The emphasis on physical fitness activities in our country has been growing rapidly. The athletic shoe industry is doing a booming business. Joggers of all ages, including President Carter, are appearing everywhere in local parks, athletic fields and on scenic thoroughfares. Cross-country skiing is also experiencing a similar boom. On the evening of July 25, 1979, 3200 men and 850 women competed in a 3.5 mile run in New York City's Central Park. To the avid jogger this might not seem unusual, but something

was uncommon about this particular race. Absent were the typical shirts embossed with the usual sneaker companies and athletic clubs. Instead, the colorful shirts carried names like Con Edison, Citibank, and NBC, etc. The race was sponsored by Manufacturers Hanover, and it was called the Corporate Challenge. In the Corporate Challenge, corporations and government agencies organize men's, women's and co-ed teams consisting of their managers and employees. Similar programs are developing throughout the country as organizations become more concerned with employee fitness.

Hundreds of companies of all sizes are providing their employees and top executives with the time and facilities for exercise. According to the Director of Program Development for the President's Council on Physical Fitness and Sports, Richard O. Keelor, PhD., government agencies such as NASA, EPA, the Smithsonian Institution, and the Departments of Transportation and Justice are also involved. The number of private firms committed to employee fitness is impressive: ARCO, Chase Manhattan, Western Electric, EXXON, General Foods, Firestone, Pepsico, Goodyear, Phillips Petroleum, Metropolitan Life, Boeing, Xerox, Rockwell International, Merrill Lynch, and scores of others. More than 300 companies now employ full-time fitness directors, and hundreds of others have more modest programs (Keelor, 1976, p. 7). This ground swell of interests was one of the contributing factors leading to the formation of the American Association of Fitness Directors in Business and Industry.

This organization was established in 1974 as a nonprofit affiliate of the President's Council on Physical Fitness and Sports and represented a significant formal nationwide endeavor to support and assist in the development of quality fitness programs in business and industry.

A growing number of corporations and government agencies, which do not offer voluntary physical fitness programs for their managers and employees, are in need of information to clarify the consequences of initiating such an effort. How much will it cost? This question can be answered only after considering the financial position of the particular company or government agency involved. How does one go about organizing a management and employee physical fitness program? The American Association of Fitness Directors in Business and Industry can provide assistance in this area. Their Statement of Purposes and Objectives is included in this report (Attachment 1), along with a Membership Criteria and Application Form (Attachment 2). Addressing a more important question, what effect will a voluntary physical fitness program have on the managers and employees who participate? More simply stated, what are the consequences of improving management and employee muscle? In terms of the effect on fitness, health, absentee rates, cost of insurance claims, etc., this last question is relatively easy to answer by referring to the many statistical studies which have been done. Keelor (1976) highlights some of these results. However, there are areas where the benefits are not obvious

and these include the psychological and behavioral changes associated with improved physical fitness and the impact of these changes on leadership ability.

Over the years, numerous studies and experiments have been undertaken in an attempt to quantify the psychological and behavioral effects of improved physical fitness. The groups studied have included marathon runners and other athletes of all types, high school and college students, Army recruits, alcoholics, West Point Cadets, retired people, executives, managers, and many others. The quality, assumptions, and techniques utilized in the research efforts have varied greatly, thus making correlations of the results extremely difficult. If one were to identify, untangle, and correlate the numerous psychological and behavioral studies and relate them to common leadership traits, the organization interested in starting a physical fitness program would then have an improved understanding of what to expect.

II. OBJECTIVES, RATIONALE AND APPROACH

A. OBJECTIVES

The primary objectives of this study are as follows:

1. Analyze and correlate the results of research studies that address the psychological and behavioral changes associated with physical fitness development.

2. Relate the uncovered psychological and behavioral changes to common leadership traits.

3. Present the above information in a form which will help government agencies and corporations gain a better understanding of the consequences of initiating physical fitness programs for their managers and employees.

B. RATIONALE

Two significant factors have become obvious after reviewing the results of numerous studies dealing with physical fitness and psychological or behavioral changes. Experimental techniques are inconsistent, and there is a need for some form of standardization. Therefore, rather than conducting another experiment to add one more set of results to an already inconsistent accumulation of data, the author surveyed existing information in an attempt to uncover similar trends and obvious correlations. Several computerized data retrieval systems were utilized for the survey effort, and they are identified in Table I.

C. APPROACH

Since one of the primary objectives was to assess the impact of physical fitness improvements on leadership traits, an understanding of leadership will be developed first. A discussion on physical fitness will follow to clarify important factors and some common measurement criteria. With this improved understanding of leadership and physical fitness, the concept of a rigorous experiment will be considered. How would an experiment look if one wanted to clearly establish the effect of improved fitness on psychological, behavioral, and leadership factors? This rigorous concept is necessary in order to put the impact of existing studies in proper perspective.

An analysis of the significant studies uncovered by the literature survey will then follow. The studies will be separated into two distinct categories consisting of longitudinal and cross sectional types. The meaning and significance of longitudinal and cross sectional studies will be identified preceding each category. Discussions of the studies will clarify the type and amount of exercise experienced by the test subjects, and the uncovered personality and behavioral changes will be identified and related to traits associated with leadership. Following the above analysis, some common philosophies will be presented to explain how personalities and behaviors might change when physical fitness is improved.

Finally, all of the results of the various studies will be summarized, tabulated and correlated with common leadership

traits. In this final form it is hoped that the third primary objective will be achieved. Government agencies and corporations will have a better understanding of the personality, behavioral and leadership changes that may occur in managers and employees when voluntary physical fitness programs are adapted.

III. LEADERSHIP

In order to gain a clear understanding of the effects of physical fitness improvements on leadership traits, some common concepts of leadership are necessary. If 100 people were solicited at random to define leadership, interpretations would probably differ greatly. The literature abounds with definitions that approach the concept from many different viewpoints. In a very thorough analysis by Stogdill (1974), definitions were grouped into eight specific areas which included leadership as:

1. A focus on group processes
2. Personality and its effects
3. Act or behavior
4. A form of persuasion
5. An instrument of goal achievement
6. An effect of interaction
7. A differentiated role
8. The initiation of structure.

For this analysis, the primary focus will be on two of the areas mentioned above, personality and its effects, and act or behavior.

Bingham (1927) and Kilbourne (1935) both broadly defined a leader as a person who possesses the greatest number of desirable traits of personality and character. Carter (1953) gives a very flexible definition: "Leader behaviors are behaviors the experimenter wishes to so designate, or more generally, any behaviors which experts in the area wish to consider as leadership behavior." These are broad definitions and it is difficult to grasp a clear understanding of

the specifics involved. Fortunately, some researchers have attempted to overcome this.

A literature survey conducted by Stogdill (1974) utilized the results of 163 studies of leader characteristics which were published between 1948 and 1970. In the area of personality, the survey identified 14 positive and significant leadership characteristics which appeared in one or more of the studies. The characteristics are listed below:

1. Adjustment, normality
2. Aggressiveness, assertiveness
3. Alertness
4. Ascendance, dominance
5. Emotional balance, control
6. Enthusiasm
7. Extroversion
8. Independence, noncomformity
9. Objectivity, tough-mindedness
10. Originality, creativity
11. Personal integrity, ethical conduct
12. Resourcefulness
13. Self-confidence
14. Tolerance of stress. (Stogdill, 1974, p. 75)

One could continue to search the literature and develop an even longer compilation of personality traits. The study of leadership appears to be a never-ending process which will hopefully become more precise as improved analysis and survey techniques are developed. Considering the primary objective of this research effort, it is sufficient to accept the 14 common and significant personality factors identified by Stogdill (1974), because of the thorough nature of his survey work. But what about leader behavior, and is there a difference between personality and behavior?

The Handbook of General Psychology (1973) indicates that most psychologists consider personality as, "a unique

organization of traits characterizing an individual, and influencing his interaction with his environment, social and nonsocial." According to the Encyclopedia of Psychology (1972), behavior is defined as, "the responses of an individual, species or group to stimuli." In other words, we usually respond to a given set of stimuli with an observable form of behavior that is consistent with our personality traits.

In a significant and notable effort to identify leader behavior, Hemphill (1950) in the Ohio State Leadership Studies postulated nine dimensions of leader behavior and considered the frequency with which they occurred, as follows:

1. Initiation - Originates, facilitates or resists new ideas.
2. Membership - Mixes with his followers.
3. Representation - Defends his group or followers against attack.
4. Integration - Encourages pleasant group atmosphere.
5. Organization - Defines or structures his own work and the work of his followers.
6. Domination - Restricts the behavior of others.
7. Communication - Provides and seeks information from followers.
8. Recognition - Expresses approval or disapproval of followers.
9. Production - Sets levels of effort or prods followers for greater effort.

Surprisingly, a significant portion of the current and more popular approaches to leader behavior address one or more of the nine dimensions identified above. Blake and Mouton (1978) focus on production and concern for people, which are related to production, membership, representation, integration, communication, and recognition. Fiedler (1967), in his leadership contingency model, highlights leader-member relations, task structure, and position power which are related to membership, organization, and domination respectively. Fleishman (1973) emphasizes the importance of consideration and initiation of structure which are related to membership, integration, and organization. Considering this supporting current literature, and the significance of the Ohio State Leadership Studies, the above nine dimensions represent a reasonable indication of leader behavior.

Presently, this analysis has narrowed down some very complicated characteristics of leadership to 14 personality traits and nine dimensions of behavior. Obviously, there is much more involved. As Jennings (1961) concluded, "Fifty years of study have failed to produce one personality trait or set of qualities that can be used to discriminate leaders and nonleaders." It is not the intent of this research effort to discriminate leaders from nonleaders or to develop a concise and accurate definition, but rather to present a reasonable number of commonly observed personality and behavioral traits that can be used for comparisons with related physical fitness test data. Logically, this raises the next issue. What is physical fitness?

IV. PHYSICAL FITNESS

Physical fitness is a commonly used concept. As in the case of leadership, it is difficult to define. According to Webster's (1964), "fit" is defined as "in good physical condition, healthy." How does one measure good physical condition, and what specifically determines healthy? In many research studies, the degree of physical fitness was defined in terms of the subjects' participation in some sort of physical activity such as membership in a high school football team or athletic club, jogger, or swimmer, etc. In other studies, the physically fit are defined as the subjects who exercised a certain number of hours for a specified period of time. In many physiological studies involving physical fitness, heart rate and systolic blood pressure during exercise and maximal oxygen uptake (MOU) are commonly used; (MOU is a measure of the maximum rate of oxygen consumption of which an individual is capable).

According to Weingarten (1970, p. 9), "Maximal Oxygen Intake (or uptake) is the most effective available measure by which the physical condition of an individual can be assessed." Leon and Blackburn (1977) indicate that heart rate and systolic blood pressure during exercise and MOU, are good measures of fitness, but these measurements are influenced by natural endowment. Hence, there is some confusion and uncertainty in establishing an individual's level of physical fitness. The work of three researchers, Ismail,

Falls, MacLeode (1965) addressed this dilemma. Statistically, they analyzed the significance of using 53 different physical fitness variables which addressed cardiovascular performance, strength and agility. Some of the more common variables included MOU, resting heart rate, sit-up and 50-yard dash performance.

Their research effort involved 89 Purdue University staff and faculty members between the ages of 23 and 58 years. The subjects participated in a five-month physical conditioning program. At the beginning and end of the program, data were collected on the 53 physical fitness variables (Ismail, Falls, MacLeode, 1965, p. 992). Statistical comparisons of the before and after data resulted in the identification of six significant variables. These six variables were then combined in a regression equation to yield one number that indicates a level of physical fitness. An interesting aspect of this result is that physical fitness is not significantly determined by strength or agility, but rather depends primarily on cardiovascular performance. This is evident when considering the nature of the six variables indicated below:

1. Submaximal exercise pulse rate.
2. Percent lean body weight.
3. Maximal Oxygen Uptake (MOU).
4. Submaximal minute volume ventilation.
5. Resting diastolic blood pressure.
6. Resting pulse rate.

Physical fitness can still mean different things to different people. Experiments are being conducted today which do not take a consistent common approach. In fact,

many researchers such as Ismail, Falls, MacLeode (1965); Data (1974); and Sjoberg (1976) have expressed a desire to standardize physical fitness measurements and assessment techniques, but this has not yet been achieved.

For the purposes of this study it is only necessary to identify some of the common concepts that are involved. The above analysis has indicated that physical fitness depends primarily on cardiovascular performance. Any measure of cardiovascular performance can logically be used to differentiate the fitness levels of individuals, but the six-variable approach of Ismail, Falls, MacLeode (1965) seems to be the most appropriate.

V. THE RIGOROUS EXPERIMENT

How could one rigorously identify the personality and behavioral changes in managers and employees which could result from a voluntary physical fitness program? First, an appropriate number of individuals in management and other employment positions would be selected at random to participate in the experiment. Two groups of equal size would be formed, the control group and the test group. A battery of personality inventories (Cattell Sixteen Personality Factor Questionnaire, California Psychological Inventory, Minnesota Multiphasic Personality Inventory, etc.) would be administered to both groups in order to establish baseline personality traits. Managerial behavior would also be established by commonly accepted tests (Managerial Grid, Lead-Self Test, Leader Opinion Questionnaire, etc.). In addition, management and employee behavior could be assessed by appropriate instruments which could be administered to peers who were not participants in either the control or test groups. Peer ratings in the past have proven to be very reliable. For example, the Aptitude for the Service Rating which measures officer potential in the Military Academy has demonstrated a reliability of .90 (Werner, 1960, p. 20-21).

An accurate assessment of each individual's physical fitness would then be made. Many different tests have been used to quantify this variable. As previously mentioned, the most thorough approach appears to be the one developed

by Ismail, Falls, MacLeode (1965). Therefore, it would be appropriate to utilize this technique. The next item would be to elevate the level of fitness of the test group, but only after medical examinations were performed to screen out any subjects with possible pathological conditions.

In order to raise fitness levels, how much exercise should be planned and for how long a period? Leon (1977) indicates that endurance exercise training provided by walking, cycling, or jogging two to four times a week for 30 to 60 minutes a session, significantly improves working capacity and cardiovascular endurance. In a study conducted by Ismail and Trachtman (1973), 60 middle-aged men were subjected to a four-month physical fitness program. The amount of exercise consisted of three 90-minute sessions each week and included jogging, calisthenics, progressive running, and recreational activities. Results of the experiment indicated significant changes in personality variables. In another study conducted by Lambert and Parish (1972), 31 volunteer students from the U. S. Naval Postgraduate School were subjected to a two-month physical exercise program. The amount of exercise consisted of approximately four 15-minute sessions each week and included either stationary bicycle riding or an "Exer Genie" exercise program (friction device used in conjunction with calisthenics). Results of the experiment indicated that personality and fitness did not significantly change. This outcome was attributed to the possibility of not enough exercise.

From the above results it may be inferred that the repetition and duration of exercise are significant variables which affect fitness levels and psychological changes. On the other hand, there must be a point at which the benefits of exercise diminish and it becomes a detriment to both physical and mental health. An example is the manager who spends so much time with physical training that he or she over-exercises and exhibits a high degree of fatigue during normal working hours. The consequences are poor on-the-job performance.

Significant personality changes can also be a detriment. Several research studies have indicated that individuals tend to become more extroverted as a result of improved fitness. An appropriate degree of extroversion is considered a positive leadership trait. However, researchers Clitsome and Kostrubala (1977, p. 1018) discovered that the percentage of introverts among marathon runners is higher than the general population by a ratio of 2 to 1. It may be that the extremely demanding physical exercise routine of marathon runners contributes to their high degree of introversion. A leader or manager who can improve his or her effectiveness by more open contact with subordinates does not need to become introverted. Therefore, the rigorous experiment should consist of several different levels of exercise over several different time periods. This approach would hopefully identify the optimum level and duration of exercise required to develop specific changes in fitness, personality and behavioral factors.

After the fitness levels of the test subjects were raised an appropriate degree, the battery of personality and managerial behavior tests previously identified would again be administered to both the control and test groups. Comparing this latest set of data to the one at the start of the experiment, the personality, behavioral and leadership changes related directly to improved physical fitness, might be identified.

Armed with this philosophy of a rigorous experiment and the previous discussions of leadership and physical fitness, we are in a better position to accurately comprehend the results of the studies uncovered by the literature survey.

VI. LONGITUDINAL STUDIES

Longitudinal studies are considered to be the most accurate when attempting to develop a cause and effect relationship between personality variables and the factors which influence them.

> "In order to demonstrate that change in psychological factors accompanies change in physical fitness, longitudinal studies of the before and after type of experiment appear to be required to obtain valid data concerning psychological changes related to fitness training. To date, there has not been sufficient research of this type to enable us to draw firm conclusions." (Hammet, 1966)

This section addresses the longitudinal studies (studies which monitor psychological variables of test subject before and after physical fitness improvements are applied, while holding other factors constant) and their implications on personality, behavior, and leadership traits.

A. NASA STUDY (1968)

During 1968, the National Aeronautics and Space Administration, in cooperation with the Heart Disease and Stroke Control Problem of the Public Health Service, sponsored a study to determine the effects of increased fitness on work, health, habits and behavior (Heinzelman and Durbeck, 1970). NASA employees were randomly selected from the Washington, D. C. payroll listings and included males age 35-55 with GS pay ratings of 11 or higher. Ultimately, 259 men volunteered for the program and were given the opportunity to choose one of three exercise programs. The options included a stress

lab which involved a series of in-door exercise activities such as stationary bicycles, treadmills, etc. (156 men), a group jogging program (59 men), and an individual program incorporating exercise similar to the group jogging program, or the options of running in place, swimming, basketball, bench stepping, bicycling, and skiing (44 men).

The participants in all three exercise programs were expected to exercise three times a week for 30 minutes a session and were instructed to exercise in a heart rate range that was 85% ($\pm$5 beats per minute) of their individual maximum predicted heart rate. A self-administered questionnaire was completed by all participants at the beginning of the program and after the program had been in operation for about one year. The questionnaire was used to determine the effects of exercise on work, health, and on habits and behavior.

Focusing on the noted changes that could affect leadership ability, Figure (1) indicates improved work performance and a more positive work attitude as a function of how well participants adhered to the exercise program. Figure (2) indicates a reduction in stress and tension. Considering the above results, it can be concluded that a physical exercise program of the style and duration indicated can produce beneficial effects in leadership related factors of improved work performance, positive work attitude, and a feeling of less stress and tension. The leadership personality and behavioral traits previously identified (Stogdill, 1974; Hemphill, 1950) are comparable with the above results in

that improved work performance is related to improved "production," positive work attitude is related to "enthusiasm," and a feeling of less stress and tension is related to "tolerance of stress." Additional results of this study revealed significant improvements in feelings of better health, greater stamina, weight loss, eating less, selecting better foods, physical activity beyond the test program, recreational activity, better sleep and rest, and reduced smoking.

B. MINNESOTA HIGHWAY PATROL STUDY (1970)

This study involved 30 Minnesota Highway Patrol Officer Candidates who enrolled in a 12-week training program during 1970. The subjects ranged in age between 22 and 30 years and were divided equally into control and test groups. The test group was subjected to a six-week daily supervised vigorous exercise program lasting approximately 45 minutes a session and consisted of running and dynamic calisthenics. Pre and post tests consisted of MOU measurements to establish levels of physical fitness, the Personality Research Form (PRF), and the Adjective Check List (ACL) to define personality variables, and the Standard Progressive Matrices to establish mental performance under physiological stress.

The results indicated that the fitness level of the test group increased significantly. This change occurred in conjunction with two significant changes in personality variables which included a decrease in the PRF "Impulsivity" scale and an increase in the ACL "Heterosexuality" scale.

In other words, the new highway patrol officers became less impulsive and more heterosexual, and this change correlated with improved physical fitness. The increase in physical fitness also positively and significantly affected mental performance during an "unduly heavy" physiological work level (physical work requiring an energy expenditure of more than 2.5 liters of oxygen per minute), a work level that a busy manager or employee might have to deal with. This conclusion was established by administering the Standard Progressive Matrices mental performance test under physiological stress, which consisted of walking on a treadmill.

After considering all of the results, the leadership implications are that improved mental performance while under unduly heavy physiological stress relates to "tolerance of stress" and decreased impulsivity relates to "emotional balance, control," two common leadership traits (Stogdill, 1974).

C. UNIVERSITY OF CALIFORNIA STUDY (1972)

Folkins, Lynch and Gardner (1972) conducted a study at the University of California, Davis, which was based on 84 junior college students. Subjects were evenly divided into test and control groups, and each group consisted of an equal number of males and females. The test group was exposed to a physical fitness development program which consisted of jogging twice a week for approximately 14 weeks. The jogging pace was tailored to each individual's ability and initially consisted of alternating running and walking

for a specified period of time. Initially the total running time amounted to approximately 11 minutes a session and the sequence eventually progressed to a five-minute warm-up and 25 to 30 minutes of continuous running. At this later stage of continuous running, the average distance covered was about three miles. The control group was exposed to a minimum amount of exercise consisting of only golf and archery courses.

Physical fitness measures consisted of the amount of time required to complete a 1.75-mile run and also resting heart rate. Psychological tests consisted of two scales from the Adjective Check List to measure self-confidence and personal adjustment and the Multiple Affect Adjective Check List to assess anxiety and depression. Two 9-point, self-rating scales were also used to measure work performance and sleep state (restless vs. sound).

Correlations between before and after physical and psychological test scores revealed significant changes in only the women. These changes consisted of decreased anxiety and depression, and increased self-confidence, adjustment and work efficiency. All of the above noted changes correlated significantly with improvements in physical fitness. Why were significant changes only observed in the women? Two possible explanations for this phenomenon were given. First, the men did not seem to be in as poor a physical condition as the women at the beginning of the experiment. This resulted in larger physical fitness improvements for the

women because all were exposed to a similar conditioning environment. Secondly, the women who chose the jogging course were more "down" psychologically than their counterparts in the control group who chose archery and golf.

Summarizing the above results, those who are in the poorest physical and/or psychological condition show the greatest chance of improvement when exposed to an exercise routine similar to the one utilized in this study. Physical improvements will also correlate significantly with psychological improvements consisting of decreased anxiety and depression and increased self-confidence, adjustment and work efficiency.

Implications of the above results are that they relate to improvements in "emotional balance, control," "adjustment, normality," "self-confidence," "tolerance of stress," and "production," all of which are common leadership traits (Stogdill, 1974; Hemphill, 1950).

D. PURDUE STUDY (1973)

At Purdue University, Ismail and Trachtman (1973) conducted a study involving 60 middle-aged men consisting of professors, administrators, business officers, counselors, and accountants. This study appears to be the most direct approach to establishing the psychological benefits of elevating one's level of physical fitness. In addition, the researchers found some unexpected changes like improvements in hearing and vision.

Before addressing the details of the experiment, it is worth noting some of the informal observations reported by the researchers because they have a direct relationship on leadership factors.

> "The men often seemed to become more open and extroverted. Although many of them had known each other well before the program started, by the time they reached the end of the program they seemed to be interacting more freely and to be more related. Their whole demeanor seemed to us to be more even, stable, and self-confident.
>
> Instead of getting his greatest satisfaction from beating others, a man would try to better his own performance by driving himself hard and subjecting himself to great stress." (Ismail and Trachtman, 1973, p. 78 and 81)

Not only do these statements imply improvements in the personal leadership behavior traits of "membership," "integration," and "communication," they also indicate the possibility of using physical fitness programs as a form of organization development. Many organization development efforts such as Process Consultation, Third Party Interventions, and Team Building, formally attempt to foster a free interaction among co-workers (Huse, 1975). This desired behavior was an indirect result of an exercise program.

Returning to the details of the experiment, physical fitness measurements were conducted at the beginning and end of a four-month conditioning program. The measurements consisted of the six factors previously described in the discussion of physical fitness. The six variables were combined in a regression equation to establish one number indicating a level of fitness. The quantity and duration of exercise

consisted of three 90-minute sessions each week for four months. Exercise routines involved warm-up jogging for ten minutes, group calisthenics for about 30 minutes, progressive supervised running which in some cases reached distances of five miles, and finally 30 minutes of basketball, squash, volleyball or swimming. Personality variables were measured by the Catell 16 Personality Factor Questionnaire. Correlations of the data were made between the beginning and end of the exercise program and also between the 14 highest fit individuals and the 14 lowest fit.

The high fitness group initially had significantly higher scores in two areas indicating "emotional stability" and "imagination." At the end of the four months, the score of the low fitness group had increased so markedly in the area of emotional stability that there no longer was a significant difference between the low and high fitness groups. The score of the low fitness group also increased significantly in the area of "imagination" but not enough to reach the level of the high fitness group. One additional significant change was noted for the low fitness group and this occurred in the area of improved self-sufficiency.

The leadership implications of the above results are very clear. Emotional stability is directly related to "emotional balance, control," improved self-sufficiency is related to "independence," and improved imagination is related to "originality" (Stogdill, 1974). A more interesting result is that improvements in emotional stability were noticed in

the initially low fit group. The initially high fit group did not significantly change. This implies that physical fitness could be a predominant factor which affects an individual's level of emotional stability, or emotionally stable people tend to be exercisers.

Summarizing the results, someone in a leadership position who is considered relatively unfit can expect significant improvements in emotional stability, creativity and self-sufficiency after improvements in physical fitness are achieved. Highly fit individuals can expect no change when exposing themselves to the magnitude of conditioning described in this particular study. It may be that the highly fit individuals require a much greater level of physical exercise before personality and behavioral changes become evident. Supporting this conclusion are the similar results previously identified in the University of California Study (1972).

E. SACRAMENTO COUNTY STUDY (1976)

Folkins (1976) conducted a study in Sacramento County, California, involving 40 males from the local police and fire departments who ranged in age from 40 to 58 years. Subjects were divided evenly into test and control groups. The test group was exposed to three exercise sessions per week for 12 weeks. The control group was not involved in the exercise program and both groups received physical and psychological tests at the beginning and end of the test program.

Physical fitness was established by measurements of MOU, systolic blood pressure, pulse, ventilation, physical work capacity and other techniques. Psychological variables were defined by three tests, the Multiple Affect Adjective Check List, the Adjective Check List, and also the Secord and Jourard Body Cathexis Scale.

Results of the study revealed only two significant personality changes in the test group, decreases in both anxiety and depression. The control group showed no significant change. Leadership implications of the personality changes are that reduced anxiety and depression contribute to both "improved adjustment, normality" and "emotional balance, control," two previously identified leadership traits (Stogdill, 1974). These results were also consistent with similar results in the University of California Study (1972).

VII. CROSS SECTIONAL STUDIES

Cross sectional studies typically are not as rigorous as longitudinal studies. They usually do not involve a control group and tend to deal with specific cross sections of the population like athletes and nonathletes, college graduates and high school graduates, etc. Even though cross sectional studies reveal differences between the groups studied (psychological and physical fitness differences, etc.), the cause and effect relationships of the uncovered differences cannot be demonstrated (Hammett, 1966, p. 766). However, the results shed some light on the subject of physical fitness and its relationship to personality, behavior, and leadership.

A. WEST POINT STUDY (1960)

A doctoral dissertation presented by Werner (1960) investigated the leadership characteristics of cadets at the United States Military Academy. The Catell 16 Personality Factor Questionnaire was administered to the class of 1958 in July 1954 and April 1958. The resultant data were then compared with several factors pertaining to athletic ability. One of the five hypotheses proposed included the following:

> "Athletes will have different leadership profiles from the profiles of nonparticipants." (Werner, 1960, p. 6)

In order to test the validity of the above statements, entering cadets were separated into three distinct categories.

1. Athletes or Lettermen at Entrance - includes preparatory school or college letter award prior to admission to the Academy.
2. Nonathletes at Entrance - includes previous participation in athletic sports for two months or more but without formal recognition (letter award).
3. Nonparticipants - includes no previous participation in athletic sports for a period over two months.

Correlations of the personality data with the above three groups revealed the following summary results:

> "The athletes at entrance to the Military Academy have statistically significant differences in eight of the personality factors. The athletes are more social, dominant, enthusiastic, adventurous, tough, sophisticated, conservative, and group dependent than are entering cadets who have not participated in organized athletics in high school, preparatory school or college.
>
> These same athletes when compared to cadets who made the athletic squad but had not received a letter for participation are shown to have statistically significant differences in two traits. The lettermen are more sociable and group dependent than the squad members." (Werner, 1960, p. 45)

Accurate conclusions of the effects of increased physical fitness on leadership cannot be drawn from Werner's study because this was not the purpose of his research effort. Participation in high school, preparatory school or college athletic squads does not guarantee a higher level of fitness over a nonparticipant. After all, some people jog, swim or exercise just to maintain or improve their personal fitness and are not interested in formal team sports. In addition, the personality profiles of athletes may be different simply

because of their desire for group participation and recognition and not their level of physical fitness.

However, despite the similarity in experience shared by the cadets during the four-year stay at the Academy, the same pattern of differences was observed at graduation. This result tends to support the assumption that athletes are more social, dominant, enthusiastic, adventurous, tough, sophisticated, conservative and group dependent because of a different level of physical fitness which resulted from participation in sports. The leadership implications of the above results are significant but the validity of assuming that improved physical fitness was the primary cause is questionable.

B. UNIVERSITY OF STOCKHOLM STUDY (1976)

Ohlsson (1976) conducted a study to determine how information processing was related to physical fitness in elderly people age 63-78 years. One might wonder how this age group is related to individuals in management and leadership positions. Surprisingly, Standard and Poors (1967) reported that 74 percent of 66,336 American executives in the 1967 Register of Corporations, Directors, and Executives were over 50 years of age. Only 168 executives were under 30, while 8,085 were in the 71-80 age group (Stogdill, 1974, p. 76).

Therefore, it appears that Ohlsson's subjects are of an appropriate age group for comparisons with many of today's leaders.

The study involved 24 male subjects. Eleven belonged to some kind of sports club, had been physically active almost all of their lives and were still considered active; these 11 were considered physically fit. The other 13 subjects revealed a life style of no regular physical training and hence were considered physically unfit.

A series of five different psychological tests characterized by high information load were administered to all subjects. The tests involved measurements of attention, reaction time, categorization, backward counting, a sorting test, and included a total of 16 specific variables. Results indicated that the physically fit group achieved significantly better mental test results in eight of the 16 variables. These included areas of attention (more correct answers), reaction time (more correct answers and more items processed per minute), backward counting (more correct answers, more answers processed, greater percentage of correct answers), and sorting (more correct answers, more concentration).

There are many individuals in leadership positions who would directly benefit from a higher degree of mental performance (more attention, faster reaction times and a higher degree of concentration). The above study indicates that physically active people in the 63-78 year age group tend to have that higher degree of mental performance, but that does not prove that physical activity caused the higher degree of mental performance.

Weingarten (1973) analyzed the results of many tests similar to Ohlsson's work and they support the above results.

> "When relatively complex cognitive problems were solved by physically fit and nonfit persons under stress, the fit consistently out performed the nonfit as a result of, maybe, a greater ability to utilize and comprehend peripheral assisting cues." (Weingarten, 1973, p. 24)

C. ARMY STUDY (1978)

Researchers Kowal, Patton and Vogel (1978) conducted an experiment involving a cross section of 200 male and 200 female Army recruits. The subjects, age 17-22 years, were selected randomly at Fort Jackson, S.C., during November, 1975, just prior to the beginning of a six-week basic training cycle. Psychological and behavioral questionnaires were administered to one-half of the participants at the beginning of the program and the remaining half at the end of basic training. The questionnaires consisted of the Spielberger State Trait Anxiety Inventory, Profile of Mood States, Eysenck Personality Inventory and a Physical Estimation and Attitude Scale. This battery of tests produced information pertaining to situational and enduring anxiety, tension, depression, anger, vigor, fatigue, confusion, introversion-extroversion, neuroticism stability, psychometric lie score, attraction to physical activity and a self estimation of physical ability. Levels of physical fitness were assessed for the entire group at the beginning and end of basic training via indirect methods for estimating MOU and by administering the Army physical fitness test, which measures

performance in running, sit-ups, etc., and is different for men and women.

Results of the experiment indicated that after the six-week program, men experienced significant increases in physical fitness as measured by both MOU and the Army physical fitness tests, but no increase was found for the female group. Psychological tests indicated that neither males nor females showed differences in the enduring personality traits of extroversion, state anxiety or emotionality. However, significant improvements were noticed in only the men with respect to increases in vigor, attitude toward physical activity, estimation of physical ability, and decreases in state anxiety, tension, depression, fatigue and confusion. The lack of significant changes in the female scores was attributed to the possibility of a higher level of maturity in women entering basic training and/or inadequate physical exercise which was substantially below the level endured by the men.

Judging this experiment against the rigorous approach, one is faced with the lack of a control group and the probability that some or all of the psychological changes were due to maturational, self-induced behavior, leader-induced behavior, or the unique environmental conditions that basic training represents. What portion of the psychological and behavioral changes were due to increases in fitness? Comparing the above results with the longitudinal studies, there are agreements in the areas of decreases in state

anxiety, tension, depression, and confusion. These four trait changes could be partially or totally due to the corresponding increases in physical fitness.

VIII. WHY COULD PERSONALITIES AND BEHAVIOR CHANGE?

The research work identified suggests that physical fitness significantly affects personality variables, but how does this come about? Typically, the changes are attributed to chemical reactions in the body, development of maturity or self-awareness, the environmental factors associated with routine physical exercise and the combined effect of all or part of the above.

Young and Ismail (1975) compared biochemical factors with personality variables before and after a physical conditioning program. Their findings verified the personality changes noted in previous studies and also showed that serum cholesterol and serum glucose are related to the personality dimensions of neuroticism and extroversion. Their conclusion was as follows:

> "The physical fitness condition of an individual--because of its physiological and biochemical correlations--may play a more important role in determining personality dimensions than has been appreciated previously." (Young and Ismail, 1975, p. 274)

The concept that physical fitness affects personality changes through the development of maturity and a greater self awareness can be understood by visualizing the dedication, sense of accomplishment, and mental discipline that typically develop when one successfully engages in a physical exercise program. This philosophy is more easily understood when considering a comment by a typical jogger describing the psychological benefits of running:

> "I have never had any serious bad habits but running has been responsible for reducing frenetic nervous drive, compulsive overwork and impatient demand for immediate social change. I am much less serious, far more easygoing, less committed to abolishing all the evils overnight, easier to live with, have greater ability to ignore and eschew peripheral issues and that jazz." (Glasser, 1976, p. 111)

Environmental factors (i.e., presence of other people) which affect personality variables during physical exercise are probably most predominant when groups of individuals jointly undertake a physical conditioning program. These include daily personal contact, team sports and the development of typical leader-follower relationships. As previously noted in the Purdue Study (1973), Ismail and Trachtman (1973) noticed the existence of significant environmental factors when assessing the progress of individuals enrolled in their physical fitness program.

In reality, the psychological and behavioral changes measured after realizing improvements in physical fitness are probably due to some portion of each of the factors mentioned in the above paragraphs. Chemical changes in body chemistry probably play a role, a greater sense of self-awareness can spill over into many aspects of personality and behavior, and environmental factors are always present during our daily routines.

IX. SUMMARY AND CONCLUSIONS

There is a growing interest among individuals, corporations, and government agencies in improving management and employee muscle. The list of the organizations that have established fitness programs in business and industry is expanding every day. The ones not yet committed are probably contemplating the consequences of initiating such an effort. This study was undertaken to give interested organizations a better idea of what to expect from improved management and employee fitness. The effort was focused on personality and behavior changes because of the significant impact that these changes can have on the individual and his work.

> "In judging the merits of endurance sports for leisure, their psychological effects may be more important than their physical implications." (Karvonen, 1976, p. 655)

> "There is no question that the psychological benefits of regular exercise can improve the quality of life." (Leon & Blackburn, 1976, p. 562)

Common definitions of leadership were considered and some typical personality and behavioral characteristics of leaders were identified. Several viewpoints and definitions of physical fitness were reviewed and the six-variable approach developed by Ismail, Falls, MacLeode (1965) was considered the most sophisticated and thorough approach to establish one's absolute level of physical fitness. Philosophies and details of a rigorous experiment were considered in order to gain a clear understanding of how one could firmly establish

the psychological, behavioral, and leadership related benefits of improved fitness.

Results of the longitudinal studies were reviewed in the context of leadership, and significant relationships were uncovered. Table II summarizes all of the significant changes resulting from improved physical fitness as identified in the longitudinal studies. Table III highlights the significant changes which relate to the common leadership traits. Remembering that longitudinal studies are needed to establish cause and effect relationships, Table III reviews such studies and links personality/behavior changes to fitness and leadership traits. It was also pointed out that relatively unfit individuals experience greater changes in personality and behavior when compared to fit individuals exposed to the same type of exercise routine, and this conclusion was supported by two separate studies (University of California, 1972; Purdue Study, 1973). In addition, it was hypothesized that highly fit individuals may require more strenuous exercise programs in order to effect substantial personality and behavioral changes.

Cross sectional studies were reviewed. They highlighted the psychological differences between various groups of individuals considered more physically fit than others. Table IV summarizes all of the results uncovered in the three studies considered. The reader should use a degree of caution when considering the results of Table IV because cross sectional studies do not establish cause and effect relationships.

The psychological differences noted may be due to factors other than physical fitness.

Many studies have been conducted that do not indicate personality or behavioral change as a result of improved physical fitness. These studies were not considered here because the intent was to identify the changes that were noticed and relate them to leadership characteristics. However, it is worth noting that many researchers who did not uncover changes were actually expecting them. When the changes failed to appear, they attributed the results to experimental techniques such as too small a sample size, not enough physical exercise, and inappropriate tests, etc.

The evidence, especially from the longitudinal studies, does indicate significant positive results. Managers and employees can both benefit from improvements in personality and behavior and these improvements have a direct impact on many of the common leadership traits. One cloudy issue was uncovered and it relates to how much exercise is necessary. As indicated in a few of the studies, too little exercise reveals no significant positive changes and it was hypothsized that too much exercise may be detrimental in terms of poor on-the-job performance and undesirable personality changes. A conclusive answer can only be achieved if someone has the time, facilities, and financial resources available to conduct a rigorous experiment similar to the one proposed.

In conclusion, it is hoped that this entire analysis has helped the interested government agency or corporation in

gaining a better understanding of the benefits of improved management and employee muscle. Any organization willing to invest the time and money to initiate a thorough program in physical fitness should get a high return for their investment. The majority of evidence points to better managers, better employees, and improved leadership capability.

AMERICAN ASSOCIATION OF FITNESS DIRECTORS
IN BUSINESS AND INDUSTRY

STATEMENT OF PURPOSES AND OBJECTIVES

The purposes and objectives of this association as stated in the articles of incorporation shall be:

1. To provide a professional organization to support and assist in the development of quality physical fitness programs in business and industry.
2. To create an increased awareness of the importance for initiating and maintaining a high level of physical, emotional, and mental health among employees.
3. To cooperate in national programs of physical fitness and sports with the President's Council on Physical Fitness and Sports and other groups with similar purposes and objectives.
4. To recommend qualifications and professional standards for fitness directors and other professional personnel in business and industry.
5. To encourage and provide support for in-service training activities and programs of continuing education for fitness directors and other professional personnel in business and industry.
6. To stimulate active research and to compile and disseminate research information regarding the effects of physical fitness programs.
7. To provide leadership in physical fitness and health for the professional.
8. To serve as a clearing house for information and services pertaining to physical fitness programs.
9. To develop operational, administrational, and educational material for physical fitness programs in business and industry.

ATTACHMENT (1)

AMERICAN ASSOCIATION OF FITNESS DIRECTORS
IN BUSINESS AND INDUSTRY

MEMBERSHIP CRITERIA AND APPLICATION FORM

Please fill out the information below and write a check (U.S. Funds) made payable to A.A.F.D.B.I.

Both the check and membership application form should be mailed to:

A.A.F.D.B.I.
c/o President's Council on Physical Fitness and Sports
Room 3030
400 - 6th Street, S.W.
Washington, D.C. 20201

Name: _____

Corporation: _____

Address: _____

Phone Number: _____ Position: _____

MEMBERSHIP CRITERIA (CHECK ONE)

/___/ Professional Member: ($35.00)

Shall be a dues paying member who is employed by a company or organization as a Fitness Director, Supervisor, Coordinator, or Instructor of a physical fitness program operated by said company or organization for its employees. The principal business of that company or organization shall be other than selling physical fitness equipment, materials, services, or systems to other individuals, organizations and or corporations. Shall be entitled to all privileges of the association.

/___/ General Member: ($25.00)

Shall be a dues paying member who is not involved in the leadership of a company fitness program, but has an active interest in physical fitness, e.g., Physical Director, YMCA Director, Member of a Governor's Council on Physical Fitness, Fitness Program Consultant, etc. Shall be entitled to the same privileges as Professional Members except the right to vote and hold office.

/___/ Student: ($15.00)

Shall be a full-time undergraduate or graduate student who has an active interest in physical fitness and or physical education and related fields. Shall be entitled to the same privileges as Professional Members except the right to vote and hold office.

ATTACHMENT (2)

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   A. DDC FILE

TABLE I.

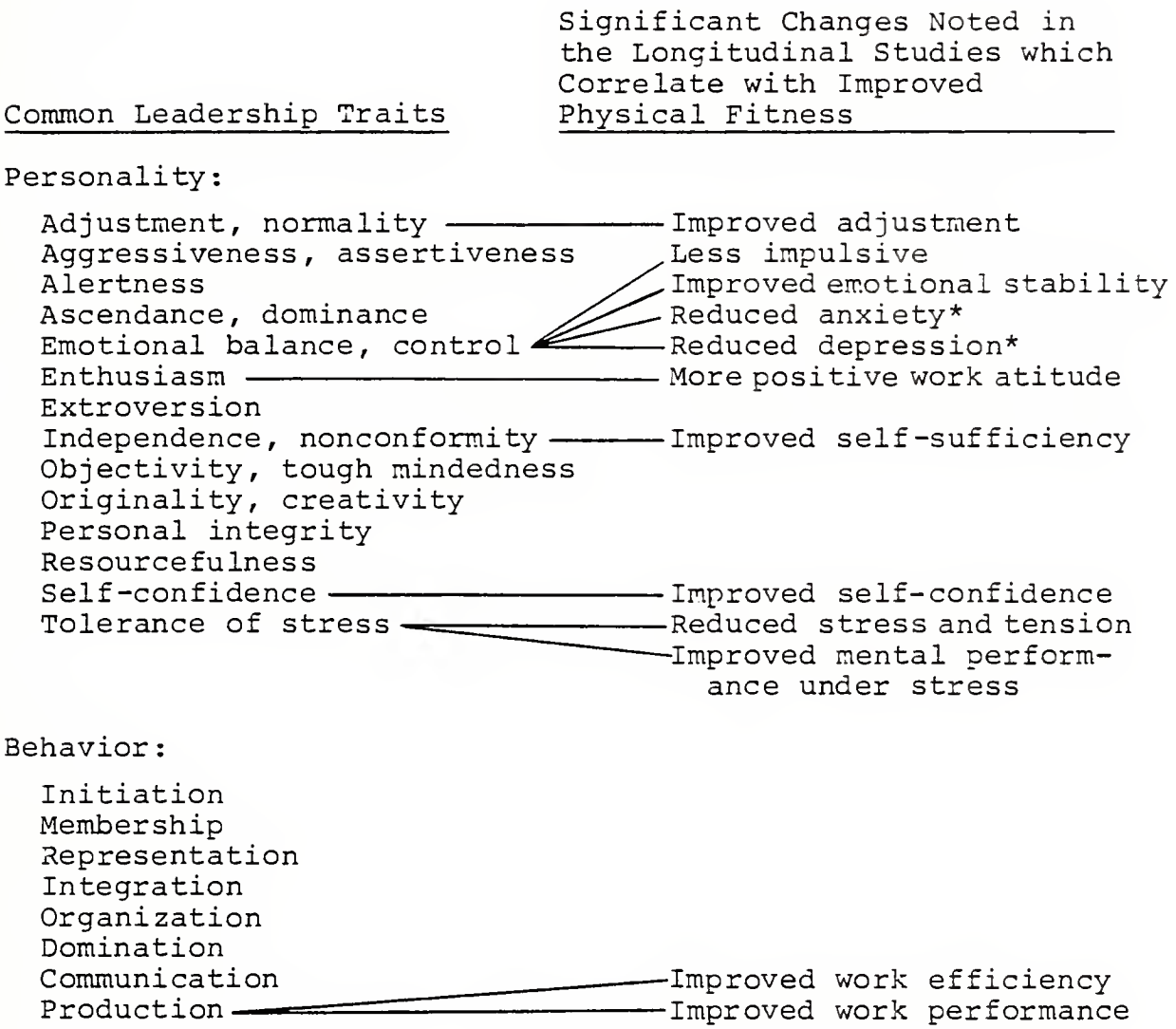
SUMMARY OF SIGNIFICANT CHANGES RESULTING FROM IMPROVED PHYSICAL FITNESS

(Longitudinal Studies)

NASA Study (1968)	University of CA Study (1972)
Improved work performance	Decreased anxiety
More positive work attitude	Decreased depression
Reduction in stress and tension	Improved self-confidence
Feeling of better health	Improved adjustment
Greater stamina	Improved work efficiency
Weight loss	
Selecting better foods	Purdue Study (1973)
Improved physical activity	
Improved recreational activity	Improved emotional stability
Improved sleep and rest	Improved self-sufficiency
Smoking less	Improved imagination
Minnesota Highway Patrol Study (1970)	**Sacramento County Study (1976)**
Less impulsive	Decreased anxiety
More heterosexual	Decreased depression
Improved mental performance while under physiological stress	

TABLE II.

SUMMARY OF SIGNIFICANT CHANGES
AND THEIR
RELATIONSHIP TO LEADERSHIP TRAITS



*Noted in two separate studies.

TABLE III.

SUMMARY OF SIGNIFICANT DIFFERENCES
NOTED IN DIFFERENT GROUPS OF PEOPLE

(Cross Sectional Studies)

1. Athletes vs. Non Athletes

West Point Study (1960)

Athletes are more:	Social
	Dominant
	Enthusiastic
	Adventurous
	Tough
	Sophisticated
	Conservative
	Group dependent

2. Physically Active Elderly vs. Physically Inactive Elderly

University of Stockholm Study (1976)

Physically active have:	More attention
	Faster reaction times
	Higher degree of concentration

3. Army Recruits at the Start of Basic Training vs. Graduation

Army Study (1978)

Graduating recruits have:	Improved physical fitness	
	More vigor	
	Improved physical activity attitude	
	Improved estimation of physical ability	
	Decreased:	State anxiety
		Depression
		Fatigue
		Confusion

TABLE IV.

NASA HEALTH EVALUATION AND ENHANCEMENT PROGRAM

PROGRAM EFFECTS ON WORK

(In relation to adherence)

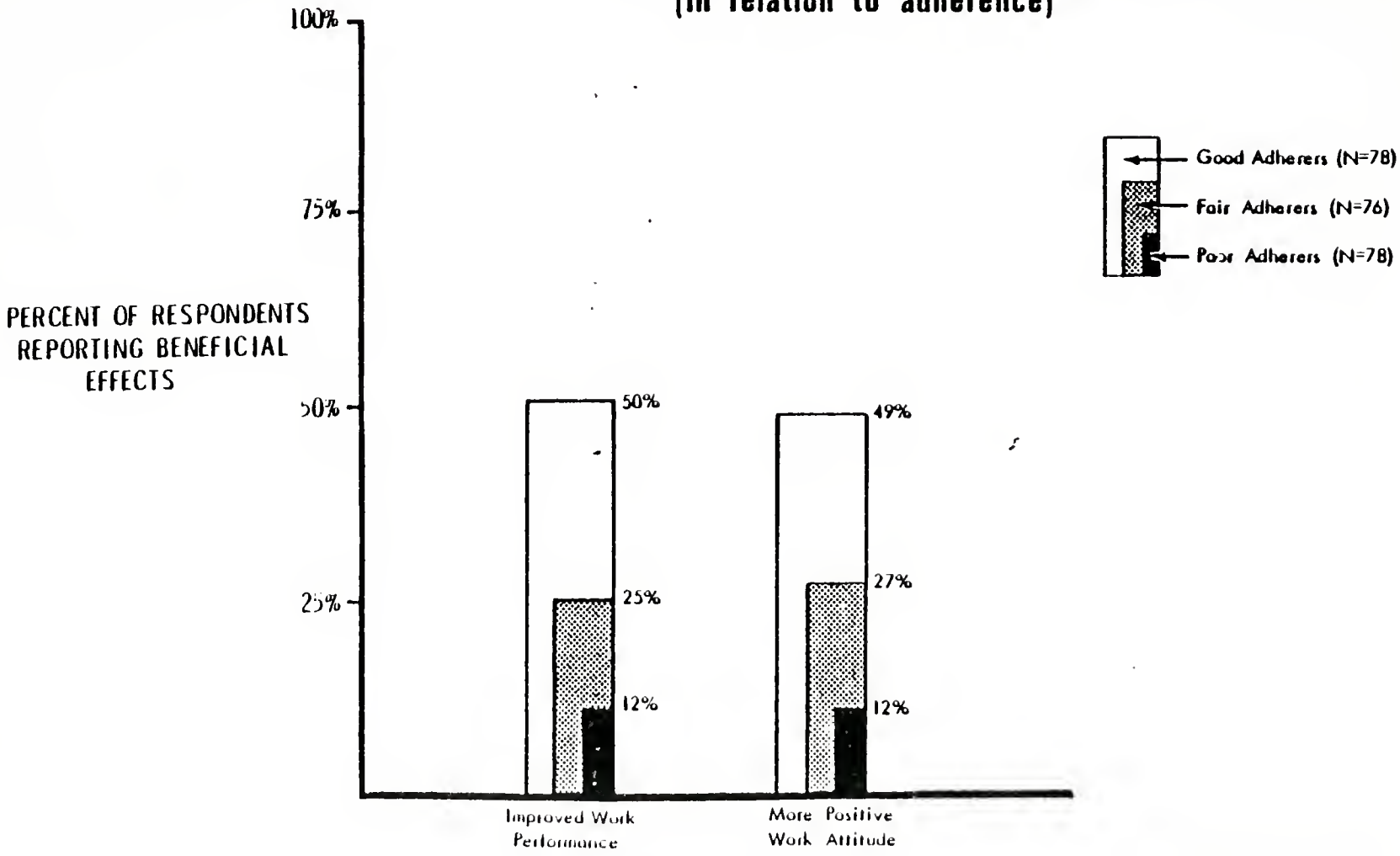


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Figure (1)

PROGRAM EFFECTS ON HEALTH

(In relation to adherence)

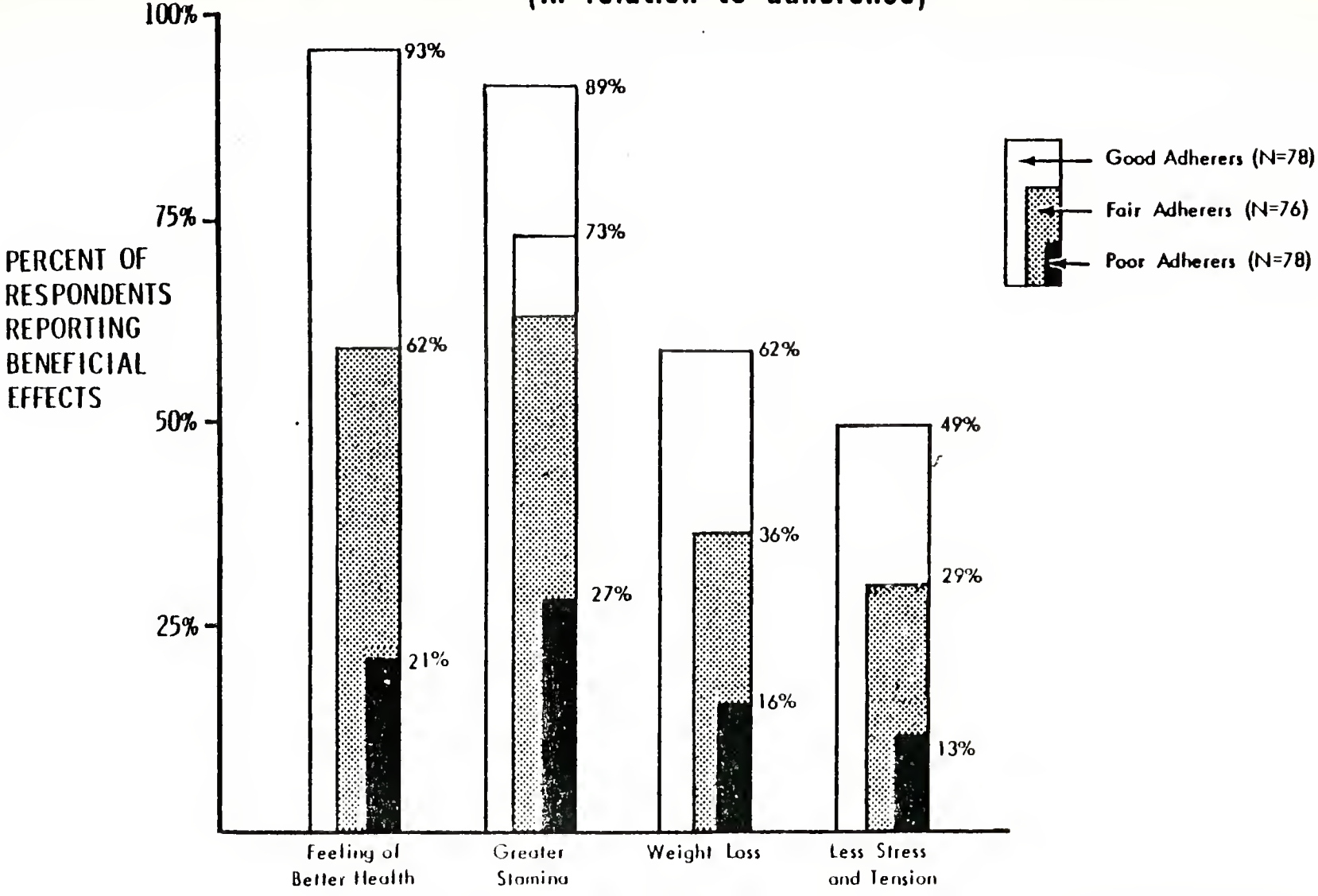

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Figure (2)

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